Modeling, Analysis, and Simulation Center (MASC)

Col Richard Gibson, MASC

11 February 1998

Overview

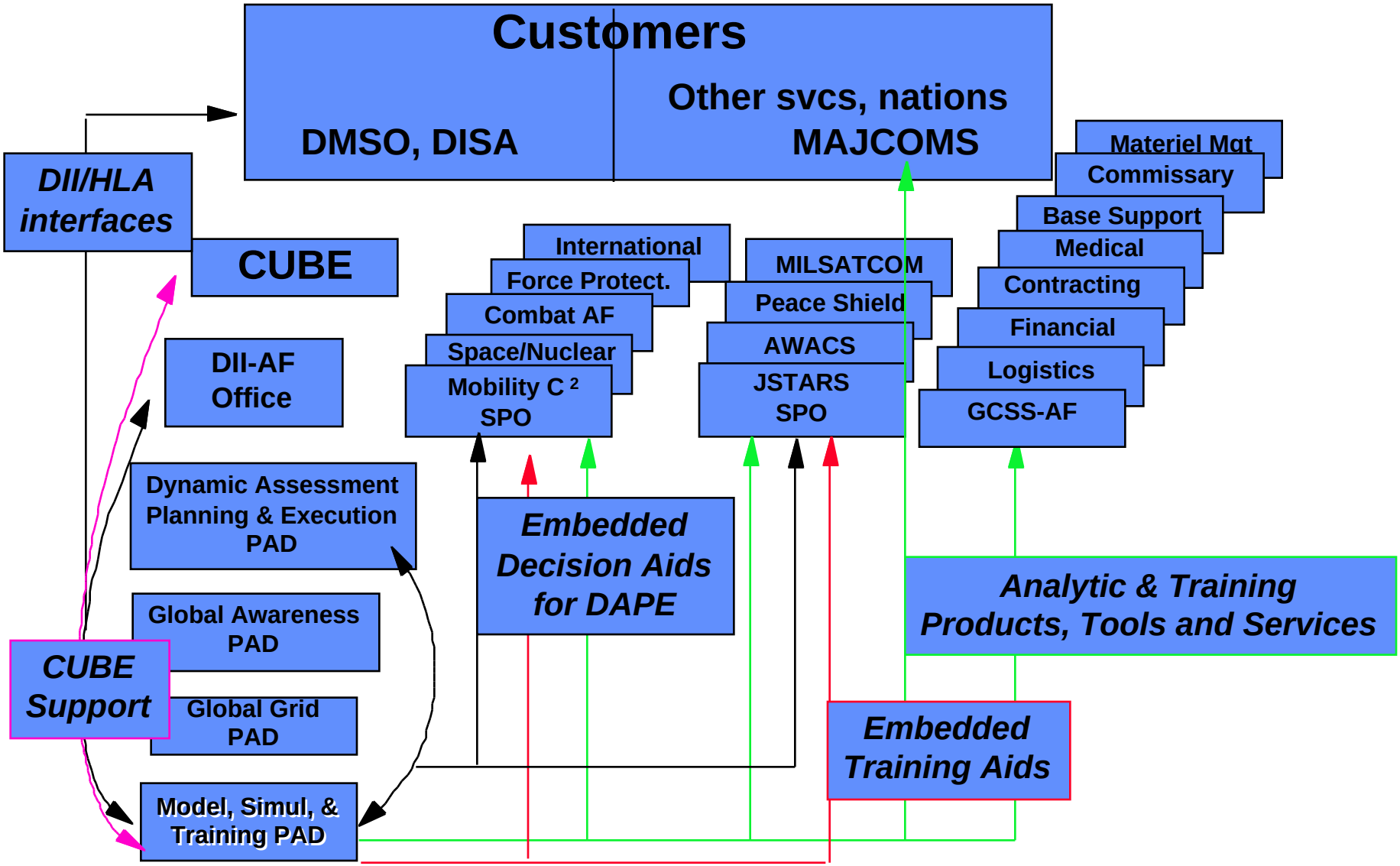
- **ESC M&S for Analysis, Acquisition, Test and Training**
- **ESC Business Process Reengineering**
  - **Modeling, Simulation and Training Product Area Directorate (MST PAD)**
- **MST PAD and AMG**
  - **What we can bring**
  - **What we're looking for**

Mission: M&S and Training PAD

Provide our customers M&S tools & services to

- **Do C2 better (training) and make better C2 decisions (decision aids, training exercises, wargames)**
- **Practice decision making, and see the results of those decisions played out convincingly through simulation**
- **Do command and control acquisition faster, better and cheaper (Simulation Based Acquisition [SBA])**
- **Allow the ESC acquisition process to deliver a more operationally effective C2 weapon system to the warfighter (Mil worth analysis & systems engineering)**

ESC Organization

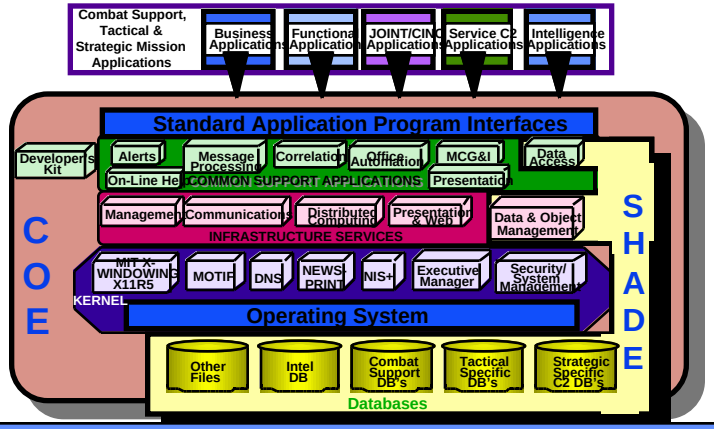


MST PAD New Objectives

- **Identify migration path to integrate HLA interoperability standards into DII-COE implemented system services**
  - **Attack and solve the C2/M&S interface problem before it eats our lunch**
  - **Incorporate HLA, including FEDEP-like processes, into the USAF C2 System Target Architecture**
- **Integrate M&S into ESC C2 acquisition processes (“spiral development”)**
  - **Model and simulate C2 processes**
  - **Support C2 T&E**
- **Migrate M&S products and tools into the integrated C2 weapon system**

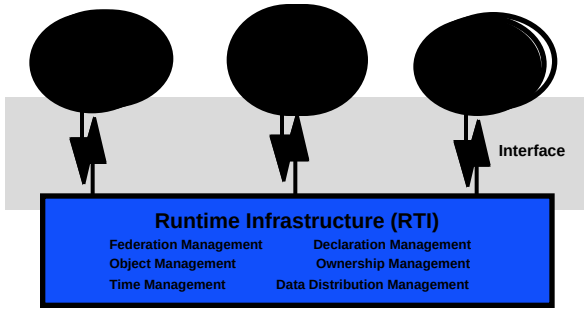
HLA-DII/COE Comparison

DII-COE



A set of guidelines/standards, architecture, software infrastructu & reusable software/data components to build a system

HLA



Facilitates simulation-to-simulation interoperability.
Defines what/how of inter-simulation interactions

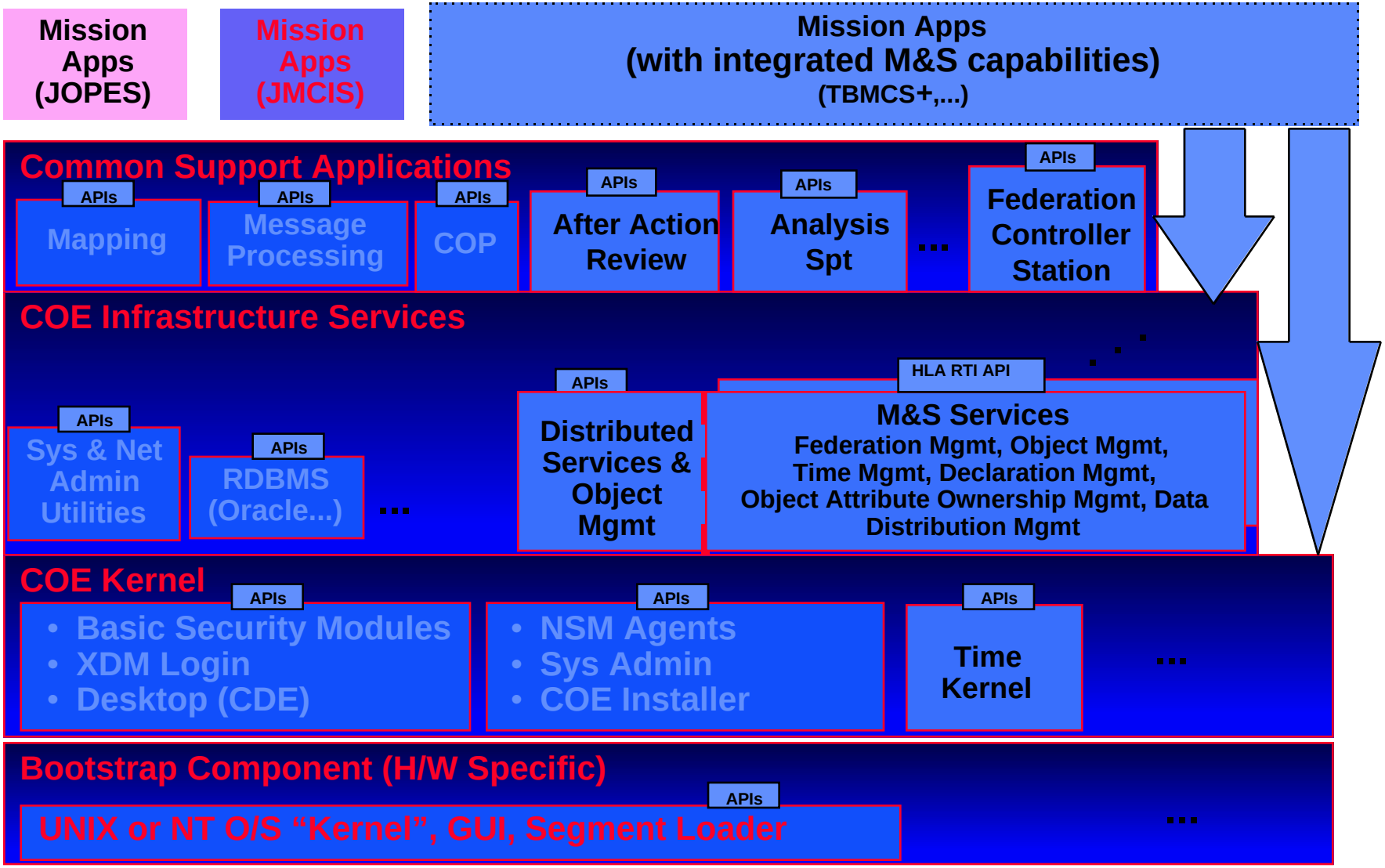
HLA/DII-COE Comparisons

- **DII-COE, HLA were originally targetted at different types of systems: Simulation federation vs. C^{4}I common services**
- **Simulation is constrained in ways not typical of C^{4}I systems, e.g., time management & levels of fidelity**
- **DII-COE is implementation specific, HLA is not**
- **Both are complementary, focusing on different aspects of systems development**

Conclusions

- **Converge HLA interoperability architecture with COE design & implementation. Impact if this is not addressed:**
  - **–increased costs**
  - **–inhibited C2/M&S interoperability**
  - **–limited simulation usefulness to C^{4}I**
- **Need to bring worlds closer together**
  - **–interoperability experiments/research**
  - **–joint discussions on architecture evolution**
  - **–simulation/C^{4}I interoperability**

HLA and DII/COE: Current, Partial MST PAD View of "The Target" -- DRAFT



Simulation to C2 Infrastructure Experiment

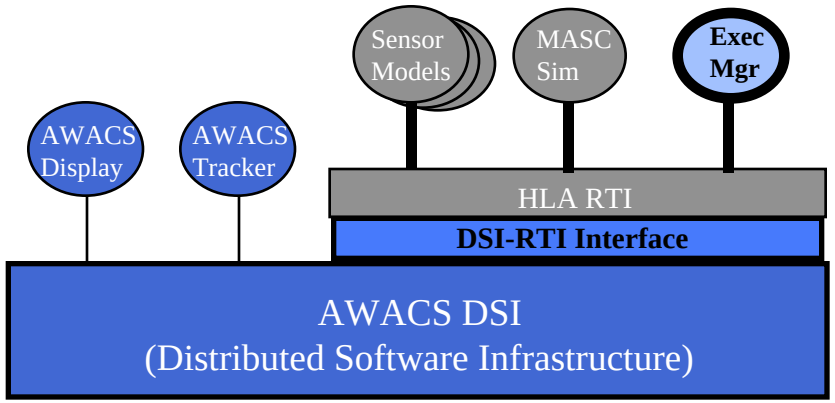
Project Number:	**03987462**
Funding:	**MOIE**
Project Leader:	**D. Flournoy**
Business Leader:	**A. Shanahan**
AF	**ESC/DIS**

Objective

- **Facilitate simulation support of C2 system development, testing, embedded training by resolving issues at software infrastructure/ architecture level**
  - **Investigate methods for bridging and/or merging HLA and DII COE, with emphasis on real-time DII COE initiatives**
  - **Focus on simulation support to specific classes of C2 systems through hands-on work with emerging DII COE infrastructures**

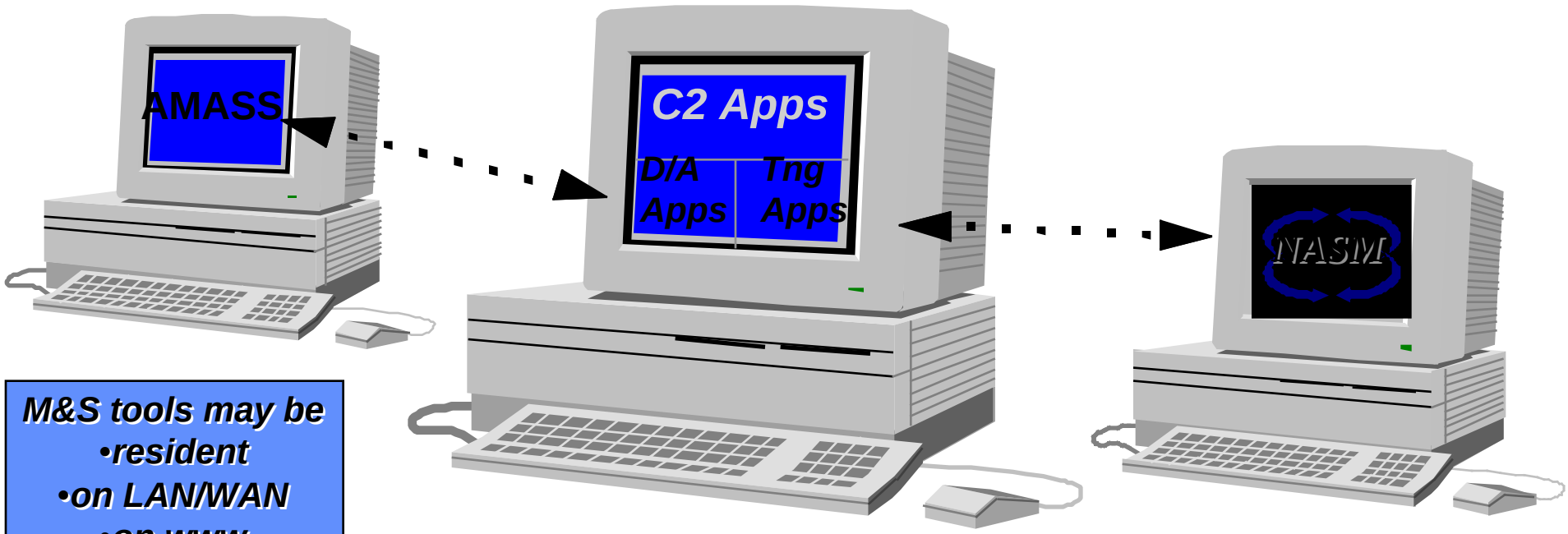
Activities

- **Develop initial HLA-DII COE integration prototype that drives AWACS software with MASC simulation capabilities**
  - **Leverage existing real-time infrastructure, HLA RTI, AWACS software applications, MASC simulation**
- **Evaluate initial configuration for performance, maintainability, flexibility**
- **Investigate additional configuration(s)**
- **Provide feedback/recommendations regarding DII COE capabilities to facilitate interoperation between simulations and C2 systems**



Patterned background delimits a federate

Objective PAD Products for ESC SPOs



M&S tools may be
- ***resident***
- ***on LAN/WAN***
- ***on www***

Decision Aid (D/A) Server (HLA/DII/COE)

GCCS Workstation (DII-COE)

Training Server (HLA)

C2 Process Modeling Experiment (SBA)

Project Number:

Funding: **MOIE**

Project Leader: **M. Makhlouf**

Business Leader:

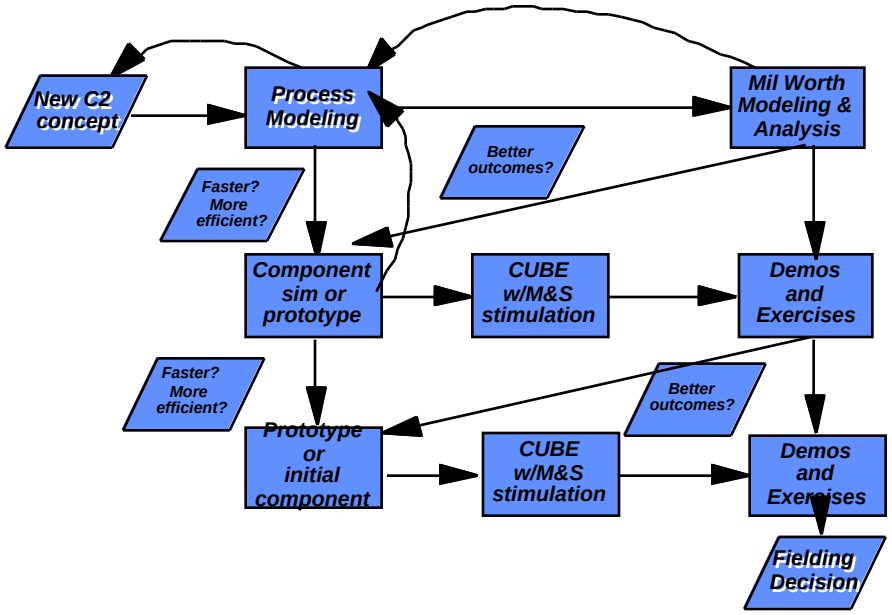
AF **ESC/DIS**

Objective

- **Facilitate simulation support of C2 acquisition by illuminating performance of new and legacy capabilities in context of entire C2 weapon system**
  - **Investigate methods for simulating legacy C2 models**
  - **Link tools and processes of requirements analysis, reverse engineering to help integrate new capabilities smartly**

Activities

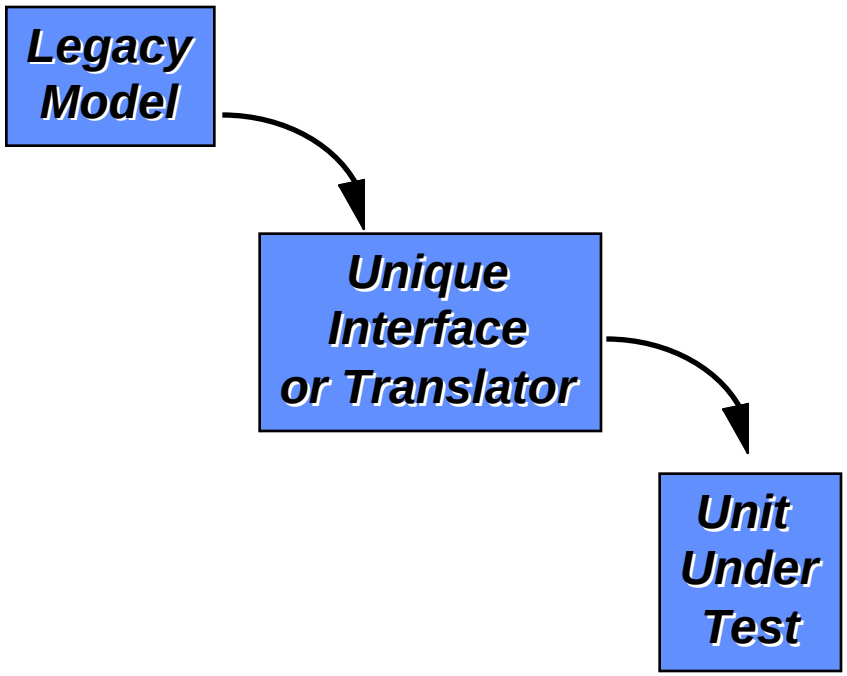
- **Rework systems engineering process and integrate legacy tools**
- **Incorporate new methodologies, e.g. colored Petri nets**
- **Support USAF's EFX98 experiments with architecture tool for ops and systems views**
  - **Foster communication between user and developer**
  - **Allow smart configuration control of evolving system**
- **Expose tool and process to new C2 initiatives, e.g., N/UWSS and Intelligence Broadcast System**



M&S Support of C2 T&E

- From demo to exercise to experiment, one lesson stands out:
  - Changes (e.g., “upgrades”) to part of a system requires significant rework throughout the system
- “Plug and play” M&S support of test, demo, exercise is a long-term goal

M&S Stimulation Paradigm



MST PAD and AMG

- What we bring
  - Experience and expertise in pushing the envelope on C2/M&S integration
    - Multiple wide-ranging efforts in training, analysis, acquisition, test
  - Lots of hard thinking, not much money…
    - Other than NASM, all other efforts are customer-funded (including SPOs), SBIR, IR&D sponsorship
- What we're looking for
  - Coordination and linkage to the Joint M&S community
    - What lessons can we learn, can we teach?
  - All the help we can get…